

CLAIMS

1. A semiconductor device comprising:
 - a semiconductor IC chip provided with an electrode pad;
 - an insulating layer formed on a surface of the semiconductor IC chip, on the side of the electrode pads;
 - a connecting terminal on an outer surface of the insulating layer; and
 - a conductive post extending through the insulating layer and connecting the electrode pad of the semiconductor IC chip to the connecting terminal;wherein the insulating layer is formed of an insulating elastic material.
2. The semiconductor device according to claim 1, wherein
 - the conductive post is formed of a conductive elastic material.
3. The semiconductor device according to claim 2, wherein
 - the conductive elastic material of the conductive post contains a synthetic rubber and conductive particles dispersed in the synthetic rubber.
4. The semiconductor device according to claim 3, wherein
 - the conductive elastic material of the conductive post is a composite paste containing an addition-polymerized silicone rubber, and 70% by weight or above Ag particles dispersed in the addition-polymerized silicone rubber, and
 - the composite paste as cured has a volume resistivity of $5 \times 10^{-3} \Omega \cdot \text{cm}$ or below.
5. The semiconductor device according to claim 1, wherein
 - a wiring layer is formed between the electrode pad of the semiconductor IC chip and the conductive post.

6. The semiconductor device according to claim 1, wherein

a wiring part is formed between the connecting terminal and the conductive post.

7. The semiconductor device according to claim 1, wherein

the connecting terminal is a solder ball.

8. The semiconductor device according to claim 7, wherein a barrier metal layer is provided between the solder ball and the conductive post.

9. The semiconductor device according to claim 1, wherein

the insulating elastic material of the insulating layer is any one of silicone rubber, fluororubber, polyurethane rubber, polybutadiene rubber, acrylonitrile-butadiene copolymer and polyisoprene rubber, and has an elastic modulus of 100 MPa or below.

10. The semiconductor device according to claim 1, wherein

the outer surface of the insulating layer of the insulating elastic material is coated with a protective layer, and a part of the connecting terminal lies at a position on the protective layer.

11. The semiconductor device according to claim 10, wherein

the protective layer is formed of a polyimide resin, a liquid crystalline polymer or an epoxy solder resist.

12. The semiconductor device according to claim 1, wherein

the semiconductor device is a wafer-level chip-scale package produced by cutting a wafer with a plurality of semiconductor IC chips.

13. A semiconductor device fabricating method comprising the steps of:

preparing a wafer including a plurality of semiconductor IC chips provided with electrode pad;

forming an insulating layer of an insulating elastic material on a surface of the wafer, on the side of the electrode pads of the semiconductor IC chips;

forming blind vias through the insulating layer;

forming conductive posts connected to the electrode pads by filling the blind vias with a conductive paste and curing the conductive paste in the blind vias;

providing connecting terminals connecting to the conductive posts; and

dicing the wafer for dividing the wafer into individual semiconductor devices.

14. The semiconductor device fabricating method according to claim 13 further comprising the step of forming a wiring layer on the semiconductor IC chips so as to be connected to the electrode pads;

wherein a metal layer is formed on the insulating layer of the insulating elastic material, the blind vias are formed through the insulating layer and the metal layer, and

a wiring part is formed from the metal layer so as to connect the conductive post and the connecting terminals.

15. A semiconductor device fabricating method comprising the steps of:

preparing a wafer including a plurality of semiconductor IC chips provided with electrode pads;

forming a layered structure consisting of an insulating layer of an insulating elastic material, an insulating protective layer and a metal layer on a surface of the wafer, on the side of the electrode pads of the semiconductor IC chips,

forming blind vias through the layered structure;

forming conductive posts connected to the electrode pads by filling the blind vias with a conductive paste and curing the conductive paste in the blind vias;

forming a wiring part connected to the conductive

posts from the metal layer of the layered structure;
providing connecting terminals connecting to the
wiring part; and

dicing the wafer for dividing the wafer into
individual semiconductor devices.

16. The semiconductor device fabricating method
according to claim 13 or 15, wherein

the conductive paste of the conductive posts is a
conductive, elastic rubber.

17. The semiconductor device fabricating method
according to claim 13 or 15, wherein

the step of forming the wiring part connecting to
the connecting terminals from the metal layer, includes
the steps of:

forming a resist film provided with openings on the
metal layer;

forming a Ni layer and a Au layer in that order or
a Cu layer, a Ni layer and a Au layer in that order by
plating in the openings and

removing the resist film and etching exposed parts
of the metal layer.